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# RESPONSE TO OFFICE ACTION

## REMARKS

In response to the Office Action mailed March 12, 2007, please enter the following amendments and consider the following remarks.

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Interview Summary

Applicant thanks the examiner and his supervisor for the telephone interview conducted on July 12, 2007. During the interview, the amendments to the claims included with this Response were discussed. The claim rejections based on Hatlestad and Burky were also discussed along with the differences between the amended claims and these references.

Amendments to the Application

The specification has been amended to include the heading "TECHNICAL DESCRIPTION OF THE INVENTION" after paragraph [0010] as requested by the Examiner.

Dependent claims 2, 3, 5, 6-12 have been amended to recite "The method" instead of "A method". Claims 1, 4 and 6 have been reformatted but there are no wording changes to those claims.

Allowable Subject Matter

Applicant thanks the Examiner for the indication of allowable subject matter in claims 2, 3, 5, 7-12 if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

Claim Rejections - 35 USC §102

i) Claims 2, 3, 5, 7-12

Claims 2, 3, 5, 7-12 have been objected to as anticipated by Hatlestad et al. (United States Patent No. 5,661,817. Hatlestad disclosed a method to record near infrared (NIR) and red (R) information using a commercially available colour CCD camera having blue (B), green (G) and red (R) pixels. The problem which Hatlestad seeks to solve is how to use the blue, green and red pixels of a commercially available natural colour camera to record the desired red (R) and near infrared (NIR) information for the generation of Vegetation Indexes—NIR/R or (NIR-R)/(NIR+R).

The solution proposed by Hatlestad is to place a filter between the object and the B, G, R pixels of the camera to only permit red and near infrared wavelength (600-1400 nm) reach to the B, G, and R pixels [see Hatlestad: column 3, lines 54-61]. Through this filter (or restriction):

- the **B and G pixels** of the camera with the filter actually receive the information of **near infrared** (770-1000 nm) (**real_NIR**) (instead of the

usual blue and green) [see Hatlestad: column 3, lines 64-67 and column 4, lines 1-4]; and
- the **R pixel** of the camera receives the information of **red AND infrared** [see Hatlestad: column 4, lines 4-6].
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Hatlestad uses the following steps to obtain the **real red (real_R)** information:

- the signal in R pixel (red and near infrared) minus the signal in B pixel (near infrared), i.e. **real_R** = R - B; or
- the signal in R pixel minus the signal in G pixel, i.e. **real_R** = R - G.

For calculating the Vegetation Index NIR/R:

- real_NIR/real_R => (in Hatlestad) B/(R-B) or G/(R-G)

For calculating the Vegetation Index (NIR-R)/(NIR+R):

- (real_NIR - real_R) / (real_NIR + real_R)
  => (in Hatlestad) [B-(R-B)]/[B+(R-B)] or [G-(R-G)]/[G+(R-G)].

Again, Hatlestad discloses a method **for recording near infrared and red information using a natural colour camera having only blue (B), green (G) and red (R) pixels.** The B, G, and R in the equations in column 4 line 23 and 24, G/(R-G) and B/(R-B), represent the B, G, R pixels of the natural colour camera, and not represent the colour actually recorded by the B, G and R pixels using the filter. Indeed, the B and G pixels receive near infrared, and the R pixel receives red plus near infrared. Hence, the equation G/(R-G) is equivalent to <u>near inferred</u> / (<u>red+near infrared</u> - <u>near infrared</u>).

Hatlestad does not disclose a method for generating a natural colour image using blue, green, red and near infrared bands as recited in claims 1, 4 and 6. The CCD camera used by Hatlestad is a commercially available natural colour camera for recording natural colour images. Hatlestad uses a natural colour camera to obtain the red and near infrared information (bands) by adding a filter (restriction), for generating Vegetation Indexes— NIR/R and (NIR-R)/(NIR+R).

In contradistinction, the present invention, however, discloses a method to enhance/adjust the colour of a natural colour image composed of the blue, green and red bands of a multispectral image having blue, green, red and near infrared bands. The bands are not filtered as in Hatlestad.

ii) Claim 6

Claim 6 has been rejected as unpatentable over Burky. Burky discloses a method for synthesizing a color image comprising:

(1) inputting a high-resolution natural colour sample of a sample area from a project area [34 in FIG-2];

(2) inputting a [low-resolution] multispectral image of the said sample area having plurality feature types [such as vegetation, building, road, soil, water, etc.][32 in FIG-2];

(3) generating a color palette for each of said plurality feature types [38a, 38b, 38x in FIG-2];

(4) applying said color palettes [38] to the [low-resolution] multispectral image of the project area [40] to generate a low-resolution natural color image of the project area [46]; and

(5) combining (fusing, or pan-sharpening) said low-resolution natural color image of the project area [46] with a high-resolution panchromatic image of the project area [48] to generate a high-resolution natural color image of the project area [52]. (see Burky, summary [0010], page 2; and FIG-2):

In other words, Burky (1) uses a sample area of a low-resolution multispectral image to compare with a high-resolution natural color image of the sample area to generate many color plates. Burky then (2) uses the plates to adjust the colour of the low-resolution multispectral image to obtain a low-resolution natural colour image. In the final step, Burky (3) fuses (pan-sharpened) the low-resolution natural color image with a high-resolution panchromatic image to obtain a high-resolution natural colour image.

In contradistinction, claim 6 of the present invention recites a method to enhance the color of a pan-sharpened natural color image (the pan-sharpened image is already produced using an existing image fusion technique before the process), for which

(1) a greenness band is generated using the panchromatic image (before the fusion) and the pan-sharpened red band (a pan-sharpened natural color image comprises a pan-sharpened blue band, a pan-sharpened green band and a pan-sharpened red band); and

(2) the said greenness band is then used to adjust the pan-sharpened green band to achieve an enhanced natural colour image.

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The differences between Burky and the Claim 6 include the following:

- Burky uses a sample of a desired natural color image as a reference to generate many color plates for each of the representative features; whereas, claim 6 of the present application neither recites the use of a reference image nor generation of colour plates.

- Burky first generates a low-resolution natural color image from the low-resolution multispectral image and then fuses the low-resolution natural color image with a high-resolution panchromatic image. Claim 6 of the present application on the other hand recites the use of an existing pan-sharpened natural color image and the improvement of the colour of the existing pan-sharpened natural colour image.